

We Claim:

1. A locking unit (102A) for a docking ring (100), the locking unit (102A) comprising:
 - a hinge bracket (104) mounted on the docking ring (100);
 - 5 a first shaft (106) positioned in the hinge bracket (104) and having a drive pulley (108) mounted thereon;
 - a first locking arm (110) mounted on the first shaft (106) adjacent to the drive pulley (108) and adapted to toggle between an unlocked position and a locked position based on a rotation of the first shaft (106), to engage with a docking panel (200);
 - 10 an actuation mechanism (112) coupled with the hinge bracket (104), comprising:
 - a wrap pulley (114) adapted to form a pulley drive with the drive pulley (108) of the first shaft (106);
 - a motor coupled to an end of the wrap pulley (114) and adapted to rotate
 - 15 the wrap pulley (114) to swing the first locking arm (110) from the locking position to the unlocking position; and
 - a lock disc (116) adapted to selectively engage/disengage to the wrap pulley (114) to prevent/allow rotation of the wrap pulley (114) and toggle the first locking arm (110) between the locking position and the unlocking position.
- 20 2. The locking unit (102A) as claimed in claim 1, comprising a torsion spring (118) positioned on an end of the first shaft (106) and adapted to swing the first locking arm (110) from the locking position and the unlocking position.
- 25 3. The locking unit (102A) as claimed in claim 1, wherein the actuation mechanism (112) comprises a drive disc (120) coupled with the wrap pulley (114) and adapted to be selectively engaged with the lock disc (116).
- 30 4. The locking unit (102A) as claimed in claim 3, wherein the drive disc (120) comprises a plurality of holes (122) and the lock disc (116) comprises a plurality of protrusions (124) adapted to be engaged in the plurality of holes (122) to restrict the rotation of the drive disc (120) and the wrap pulley (114).

5. The locking unit (102A) as claimed in claim 1, wherein the pulley drive is a cross-pulley drive and comprises a cable (126), such that the cable (126) drives the drive pulley (108) upon the rotation of the wrap pulley (114) to move the first locking arm (110) from the locking position and the unlocking position.

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6. The locking unit (102A) as claimed in claim 1, wherein the actuation mechanism (112) comprises:

a motor shaft (128) adapted to transmit the motion from the motor to the wrap pulley (114);

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a first disc (130) mounted on the motor shaft (128) and comprises a plurality of pins (133); and

a second disc (132) mounted on the motor shaft (128) and comprises a plurality of slots (135) adapted to receive the plurality of pins (133),

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wherein the engagement of the plurality of pins (133) in the plurality of slots (135) restricts a back driving of the motor.

7. The locking unit (102A) as claimed in claim 1, comprising:

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a first proximity sensor (134) in communication with an actuator (138) of the actuation mechanism (112) and adapted to detect the docking panel (200) and generate a first signal for indicating the presence of docking panel; and

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a second proximity sensor (136) in communication with the actuator (138) and positioned below the first proximity sensor (134) at a predefined space to detect the docking panel (200) and generate a second signal to actuate the engage the lock disc (116) with the drive disc (120) through the actuator (138) to rotate the first locking arm (110) from the unlocked position to locked position.

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8. The locking unit (102A) as claimed in claims 3 or 7, wherein the actuator (138) is a solenoid actuator (138) coupled with the lock disc (116) and comprises a plunger (140) adapted to be retracted, based on an input received from the first proximity sensor (134) and the second proximity sensor (136), to disengage the lock disc (116) from the drive disc (120) to allow the rotation of the wrap pulley (114).

9. A docking ring (100), comprising:

a plurality of petals (101) positioned on a periphery of the docking ring (100);
a first locking unit (102A) positioned on the periphery of the docking ring (100),
adjacent to the plurality of petals (101), the first locking unit (102A) comprising:

a hinge bracket (104) mounted on the docking ring (100);

5 a first shaft (106) positioned in the hinge bracket (104) and having a
drive pulley (108) mounted thereon;

a first locking arm (110) mounted on the first shaft (106) adjacent to the
drive pulley (108) and adapted to toggle between an unlocked position and a
locked position based on a rotation of the first shaft (106), to engage with a
10 docking panel (200);

an actuation mechanism (112) coupled with the hinge bracket (104),
comprising:

a wrap pulley (114) adapted to form a pulley drive with the drive
pulley (108) of the first shaft (106);

15 a motor coupled to an end of the wrap pulley (114) and adapted
to rotate the wrap pulley (114) to swing the first locking arm (110) from
the unlocking position and the locking position; and

a lock disc (116) to selectively engage/disengage to the wrap
pulley (114) to prevent/allow rotation of the wrap pulley (114) to toggle
20 the first locking arm (110) between the locking position and the
unlocking position.

10. The docking ring (100) as claimed in claim 9, comprising a plurality of second locking
units (102B) positioned on the periphery of the docking ring (100) adjacent to the first
25 locking unit (102A), each of the plurality of second locking units (102B) comprises:

a hinge bracket (104) mounted on the periphery of the docking ring (100);

a second shaft (106') positioned in the hinge bracket (104) and having a drive
pulley (108') mounted thereon; and

a second locking arm (110') mounted on the first shaft (106) adjacent to the
drive pulley (108) and adapted to toggle between the unlocking position and the locking
30 position,

wherein the wrap pulley (114) of the first locking unit (102A) forms a pulley drive with the drive pulley (108) of each second locking unit (102A) to synchronize motion of the second locking arm (110') of each second locking unit (102A).

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